METHODIST LADIES' COLLEGE

Methodist Ladies' College
Semester 1 Sample Examination

Question/Answer Booklet

MARINE AND MARITIME STUDIES
ATAR Year 11

Student Name: _____

Teacher Name: _____

Time allowed for this paper
Reading time before commencing work: ten minutes
Working time for paper: two and a half hours

Materials required/recommended for this paper
To be provided by the supervisor
This Question/Answer Booklet
Multiple-choice Answer Sheet

To be provided by the candidate
Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters
Special items: non-programmable calculators approved for use in the WACE examinations;

Important note to candidates
No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

Structure of this paper

Section	Number of questions available	Number of questions to be answered	Suggested working time (minutes)	Marks available	Percentage of total exam	Your mark
Section One: Multiple-choice	20	20	30	20	20	
Section Two: Short answer	6	6	90	90	50	
Section Three: Extended answer	2	1	30	25	30	
				Total	100	

Instructions to candidates

a. The rules for the conduct of ATAR course examinations are detailed in the Year 11 Course Handbook. Sitting this examination implies that you agree to abide by these rules.

a. Answer the questions according to the following instructions.

Section One: Answer **all** questions on the separate Multiple-choice Answer Sheet provided. For each question, shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. If you make a mistake, place a cross through the square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answer. No marks will be given if more than one answer is completed for any question.

Sections Two and Three: Write your answers in this Question/Answer Booklet.

b. You must be careful to confine your responses to the specific questions asked and to follow any instruction that are specific to a particular questions.

c. Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

- Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
- Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the questions that you are continuing to answer at the top of the page.

Section One: Multiple-choice **20% (20 marks)**

This section has **20** questions. Answer **all** questions on the separate Multiple-choice Answer Sheet provided. For each question, shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Suggested working time: 30 minutes.

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1. The following piece of equipment is used to measure which factor in the field?

   a. depth
   b. turbidity
   c. level of light reflection
   d. salinity

2. Petroleum is formed from:

   a. land plants
   b. marine algae
   c. diamonds
   d. dinosaurs

3. The most appropriate method for estimating a population of sea snails on a rocky intertidal reef would be:

   a. the random quadrat method.
   b. the ‘capture-tag’ method.
   c. estimating the percentage cover of the species.
   d. drawing a line transect.

See next page

The next two questions (Qu 4 and 5) refer to the following information.

'The Imperial shrimp utilises the sea cucumber for movement purposes - hanging on tight through waters filled with the shrimp's food source, only disembarking to have a bite, then climbing back onboard to further its travel to the next feeding ground. The sea cucumber gains no benefit from the relationship and is unharmed by the Imperial shrimp'.

4. This relationship can be best described as a form of:

    a. mutualism.
    b. parasitism.
    c. symbiosis.
    d. commensalism.

5. If the sea cucumber was harmed by the relationship with the Imperial shrimp, it would now be termed as a form of:

    a. mutualism.
    b. parasitism.
    c. symbiosis.
    d. commensalism.

6. Which of the options in the list below contain the correct respective terms to complete the following sentence?

    Over the land, most of the water in the atmosphere results from _____, whereas over the oceans, most of the water in the atmosphere results from _____.

    a. evaporation/transpiration
    b. precipitation/evaporation
    c. transpiration/evaporation
    d. transpiration/precipitation

7. State the physical property of seawater that acts as a thermostat and moderates the temperature of the earth.

    a. Seawater temperature
    b. Heat capacity
    c. Carbon cycle
    d. Greenhouse effect

8. The ultimate source of energy for most life in the ocean is:

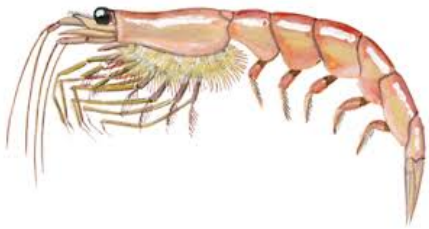
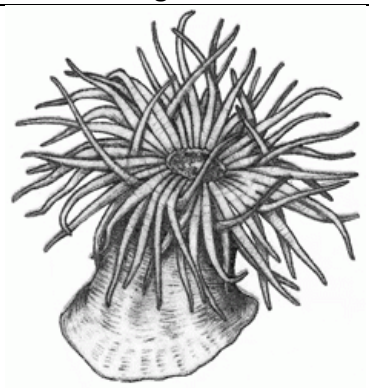
    a. photosynthesis.
    b. the Sun.
    c. thermal vents.
    d. phytoplankton.

See next page

9. The method used to remove sulfur compounds from natural gas is called:

    a. Glycol dehydration.
    b. Distillation.
    c. Sweetening.
    d. Solid-desiccant dehydration.

10. The table below shows drawings of three organisms (A, B and C).

Organism A	Organism B	Organism C
		

Which of the following options correctly classifies organisms A, B and C into their respective phyla?

	Organism A	Organism B	Organism C
a.	Crustaceae	Porifera	Nematoda
b.	Vertebrata	Echinodermata	Echinodermata
c.	Crustaceae	Algae	Echinodermata
d.	Arthropoda	Cnidaria	Mollusca

11. The diagram below shows three populations that make up a food chain in a coastal marine ecosystem.

If a new predator that also feeds on fish moves into the ecosystem, what might happen to the numbers in the three populations?

    a. Numbers of all three populations would decline.
    b. Numbers in population 2 would decline but 1 and 3 would increase.
    c. Numbers in population 1 would increase but 2 and 3 would decline.
    d. Numbers in population 2 would decline but 1 and 3 would stay the same.

See next page

12. The largest store of carbon molecules on earth is in:

    a. the atmosphere.
    b. fossil fuels.
    c. marine sediment.
    d. cold ocean water.

13. Which of the following management zones extends to a maximum of 24 nautical miles from the territorial baseline and requires the Australian Government to enforce customs, economic, immigration and sanitary laws?

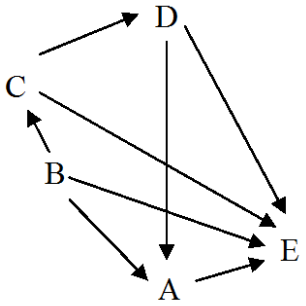
    a. The Australian Fishing Zone (AFZ)
    b. Australian Exclusive Economic Zone (AEEZ)
    c. Contiguous Zone
    d. Continental shelf.

14. The scientists from Western Australian Fisheries Department are aiming to tag around 20,000 herring over the next three years. The success of their research will depend on a high level of 'recapture reporting' from the general public. There will be a capture reward value written on the tag, ranging from $5 to $100.

    What is the greatest benefit of tagging the herring?

    a. Recreational fishermen are going to earn money from fishing herring and therefore will apply a greater fishing effort to that species (rather than fishing other species).
    b. Scientists will be able to gather information regarding the distribution of the herring population over a given area and can relate this to the fishing effort on the species.
    c. Fishermen will be able to easily identify the species that they have caught and whether or not it is of correct size.
    d. Ecosystem Based Management techniques for fisheries require the scientists to consider the abundance of all species in a given area and hence the diversity of the herring population.

15. The diagram below shows a food web found in a particular marine ecosystem.



    From this diagram, it is possible to conclude that A, B and C, respectively are:

    a. a producer, a herbivore and a decomposer.
    b. an omnivore, a producer and a herbivore.
    c. a decomposer, a carnivore and a producer.
    d. a herbivore, a decomposer and an omnivore.

See next page

16. Advances in electronic equipment onboard recreational fishing boats, such as Global Positioning Systems (GPS), have increased the success rate of local fishermen all over the world.

    This is mainly due to the fact the Global Positioning Systems:

    a. can be used to locate fish at certain depths.
    b. provide the exact location of good fishing spots which can be recorded for repeated use.
    c. manually steer the boat to the fishing spot whilst the crew are preparing to fish.
    d. have made fishing a safer recreational activity, so fishermen are more likely to go into deeper water where the fish are located.

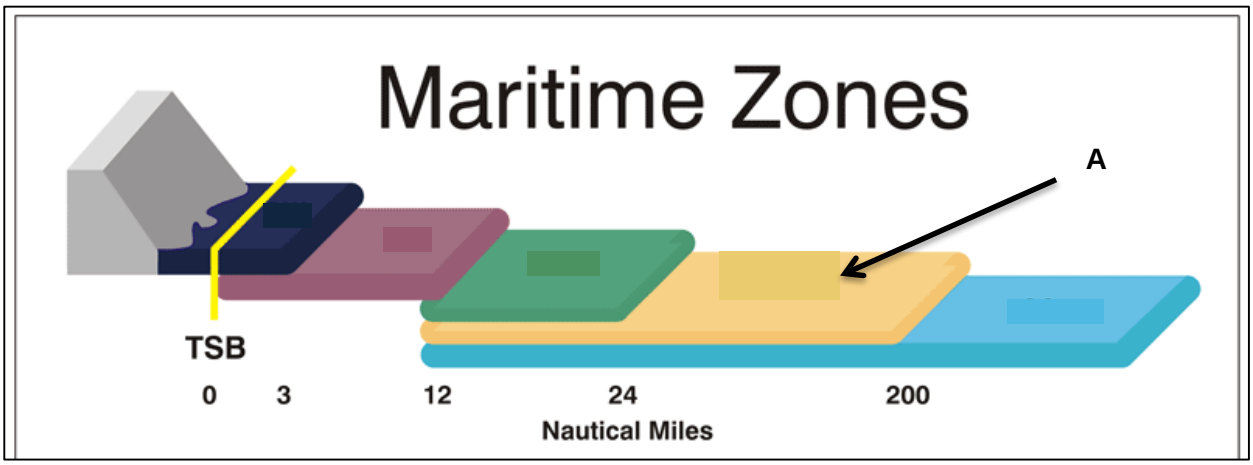
17. Which of the following organisms possess radial symmetry, tube feet, a water vascular system and a continuous digestive tract?

    a. sea star
    b. oyster
    c. jellyfish
    d. marine bristle worm

18. The process by which bacteria converts ammonia into nitrates is called:

    a. nitrification.
    b. assimilation.
    c. fixation.
    d. ammonification.

19. The maritime zone indicated by the letter 'A' is:



    a. Fishing Zone (FZ)
    b. Exclusive Economic Zone (EEZ)
    c. Contiguous Zone
    d. Continental shelf.

See next page

20. The following excerpt is taking from a Chicago Tribune article titled *'As El Nino exits, La Nina looms, promising her own kind of mayhem'* published on 30th May. Read the excerpt and then answer the question that follows.

    'While the world waits to see if a La Nina will develop, there's always a chance it could fizzle. Forecasters were certain an El Nino would form in 2014, only to see it fall apart. The prediction models are better around June and July than they are now, according to Michelle L'Heureux, a forecaster for the Climate Prediction Center'.

    What type of data would you expect the Climate Prediction Center scientists to be closely monitoring?

    a. A cooling of the water temperature off the northern and eastern coastlines of Australia.
    b. A positive Southern Oscillation (ENSO) index value.
    c. A weakening of the positive Sea Surface Temperature anomalies in the Pacific Ocean.
    d. A warming of the water temperature in the middle of the Pacific Ocean.

End of Section One

See next page

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See next page

Section Two: Short answer **50% (90 marks)**

This section has **6** questions. Answer **all** questions. Write your answers in the spaces provided.

Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

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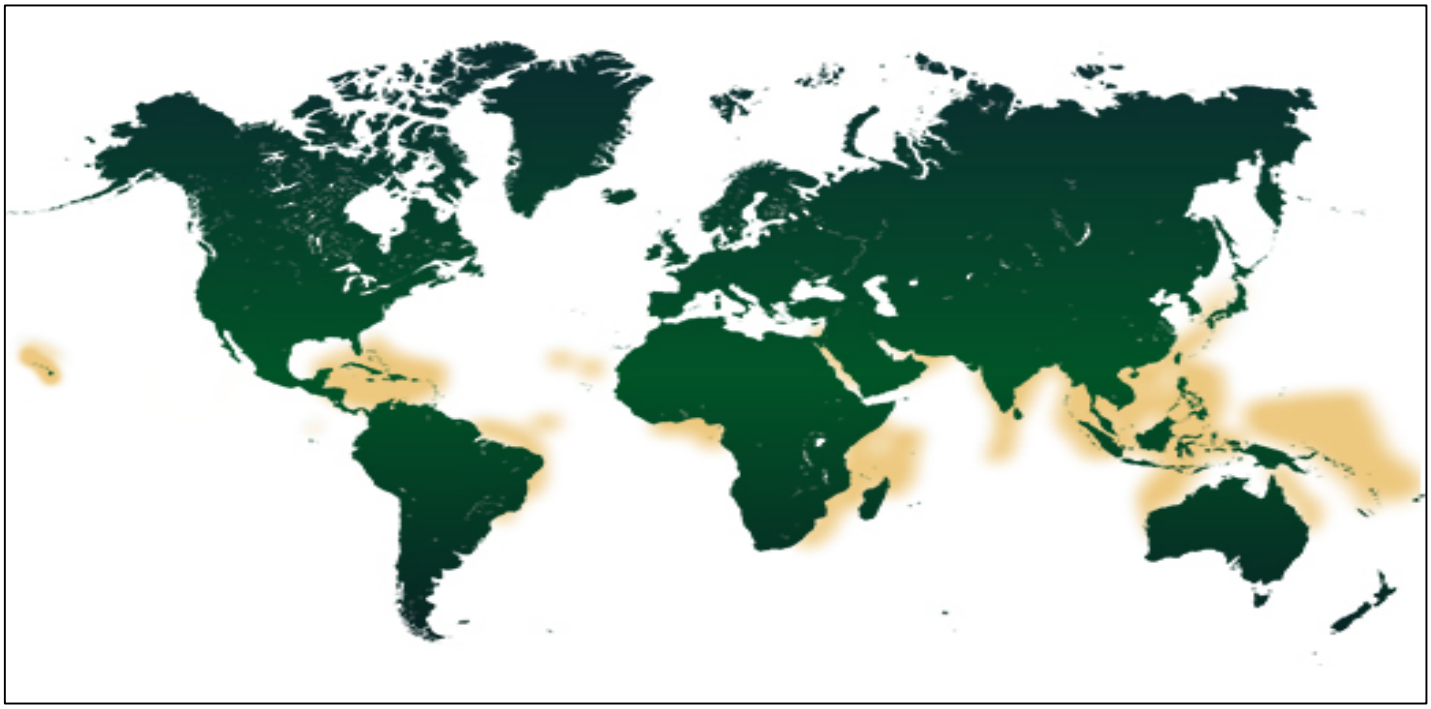
Suggested working time: 90 minutes.

Question 21 **(13 marks)**

a. The following map indicates the distribution of coral reefs around the world.



Suggest four reasons to account for the global distribution pattern of coral reefs.

_____

_____

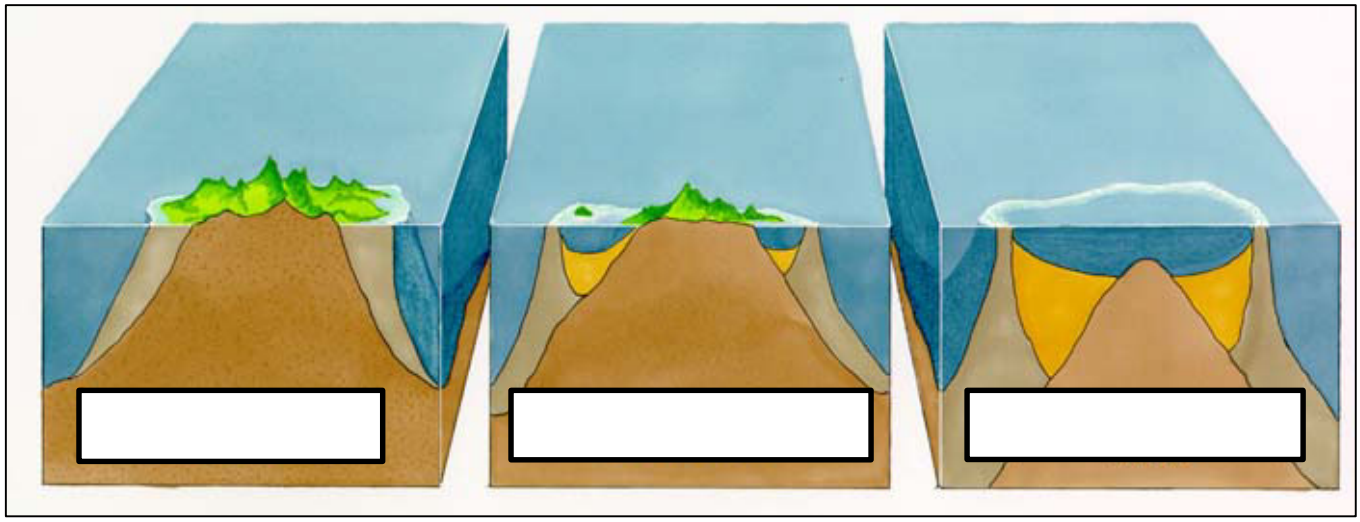
_____

_____

_____

4 marks

b. On the following diagram, label the 3 stages of coral reef formation.



3 marks

c. Roughly one-quarter of coral reefs worldwide are already considered damaged beyond repair, with another two-thirds under serious threat.

Briefly explain three ways in which humans are threating the survival of coral reefs.

Question 22 **(21 marks)**

a. Explain how temperature variation in bodies of water creates ocean currents.

5 marks

b. State whether **surface** currents or **density** currents would cause an object floating in the middle of the ocean to move forward. Explain your answer.

3 marks

c. Explain why the largest changes in salinity concentration are closest to the ocean surface.

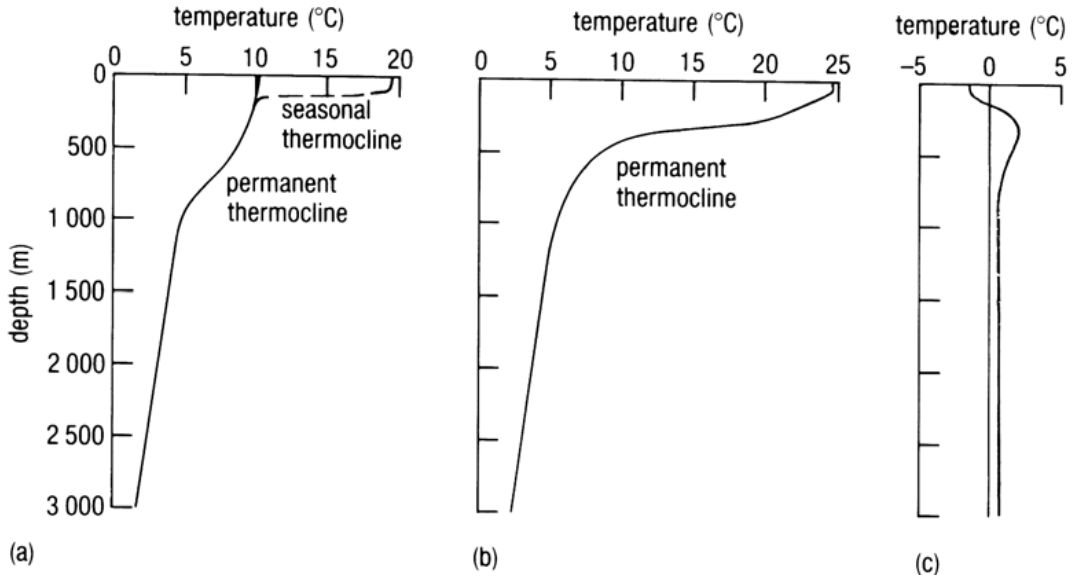
4 marks

d. Explain the relationship between salinity and density in seawater.

2 marks

See next page

e. The following three graphs illustrate the relationship between mean ocean temperature and depth at various locations in the ocean.



Which of the following figures (a, b, c) corresponds to equatorial, temperate and polar regions? Explain your answer.

(a) _____

(b) _____

(c) _____

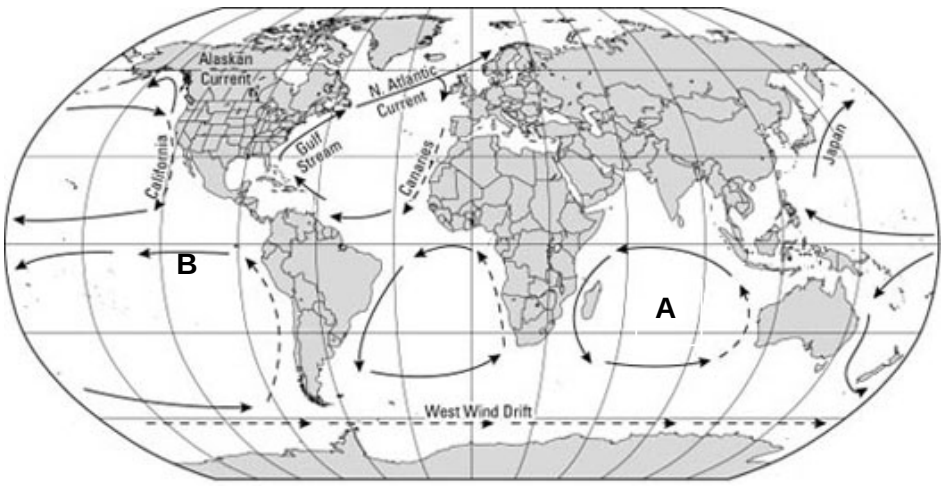
_____

_____

_____

5 marks

f. Using the following map, identify the ocean currents/gyres indicated by the letters 'A' and 'B'.



A = _____ B = _____ 2 marks

See next page

Question 23 **(13 marks)**

a. State the main components of seawater and give two examples of solutes that are found to occur in oceanic water.

4 marks

b. State the average salinity of oceanic seawater (including units of measurement).

1 mark

c. Describe the steps taken to produce sea salt from a marine environment.

5 marks

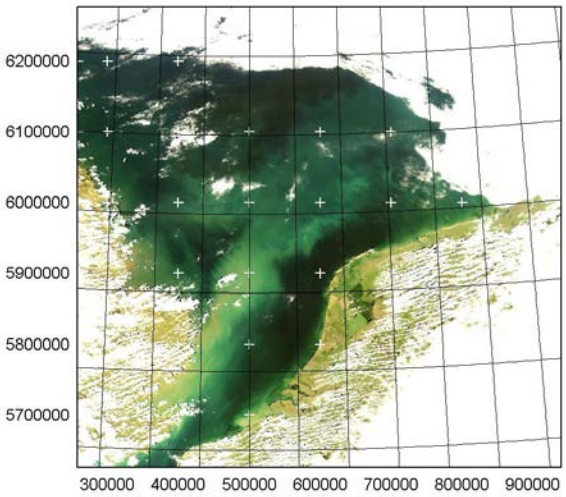
d. Where in Western Australia would you expect a salt extraction facility? Explain your answer.

3 marks

See next page

Question 24 **(6 marks)**

a. In some coastal regions the ocean can appear a greenish colour, as illustrated by the picture on the right which taken via satellite imagery.



Explain why this colouration often occurs in coastal regions.

3 marks

b. A red fish swimming at the surface of the ocean appears red because it reflects red light.

What colour would the same fish appear (perhaps to another fish) when swimming at a depth of 60m of water? Explain your answer.

3 marks

Question 25 **(14 marks)**

a. State the difference between the pelagic and benthic zones.

2 marks

See next page

b. The deep ocean provides a challenging environment for the organisms that live in this zone.

List five abiotic factors that deep sea organisms must tolerate to be able to survive in that habitat.

5 marks

c.

i. Define the term 'photic zone'.

1 mark

ii. Explain why the rate of primary production is higher in the photic zone than in other parts of the ocean.

3 marks

iii. Explain how an upwelling, such as off the coast of South America, increases the rate of primary production in the photic zone.

3 marks

See next page

Question 26 **(23 marks)**

a. In the space below, write the equation that describes the rate at which a population increases or decreases.

2 marks

b. State two density-dependent factors that can influence a Baldchin groper population.

_____

_____

2 marks

c. Explain why Baldchin groper populations are predicted to take a long time to recover from sustained overfishing.

_____

_____

_____

_____

3 marks

d. Which aspect of the Baldchin groper's life cycle makes it difficult for scientists to make long term population predictions? Explain why this is a problem.

_____

_____

_____

_____

3 marks

See next page

e. From November 1 to January 31, the Abrolhos Islands Fish Habitat Protection Area is closed for Baldchin groper fishing.

Using your understanding of fisheries management, what is the most likely reason for this closure and explain how this decision would lead to an increase in the Baldchin groper population.

6 marks

Question 26 Part f is based on the following information which is illustrated by Figures 1 (a) and 1(b).

Consider the information presented carefully and then answer the question on the following page.

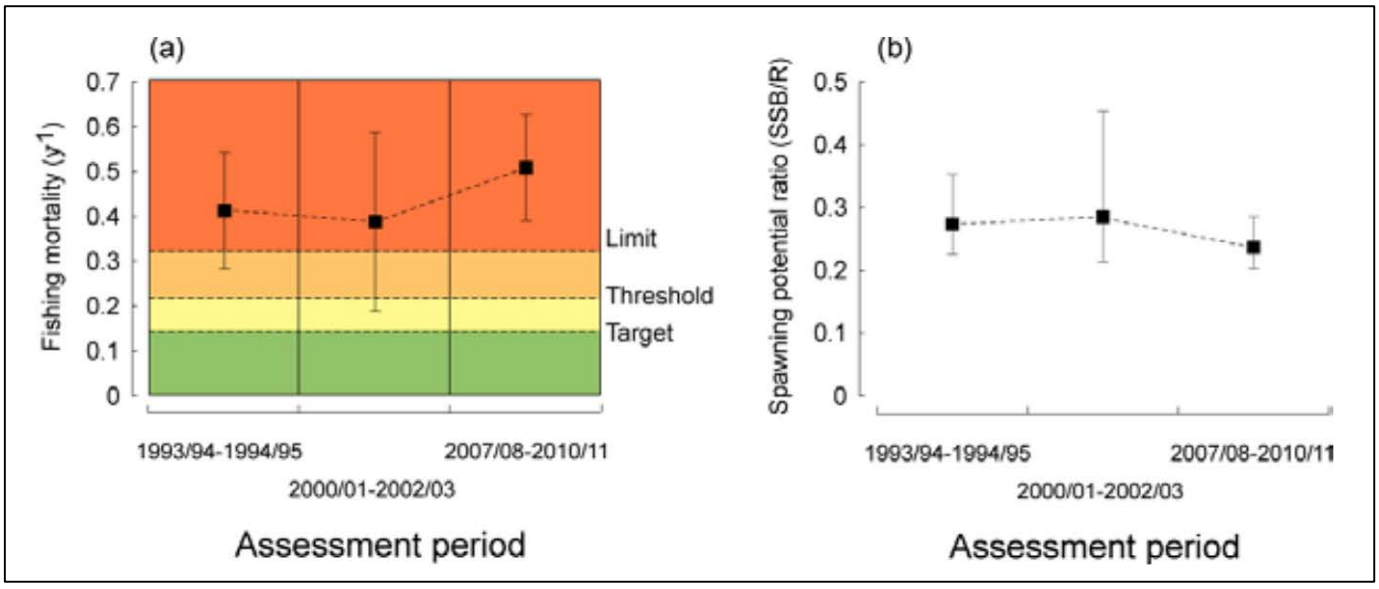


Figure 1: (a) Mean rate of fishing mortality and (b) spawning potential ratio for Baldchin groper in the Abrolhos Islands Zone A for three assessment periods between 1993/94 and 2010/11.

See next page

f. Based on the trends shown by these graphs, what recommendations would you make for the Baldchin groper fishery? Justify your answer.

5 marks

g. Why is it important to manage Baldchin groper stocks sustainably?

2 marks

End of Section Two

See next page

Section Three: Extended answer **30% (25 marks)**

This section contains **two (2)** questions. You must answer **one (1)** question. Write your answers on the lined pages provided following Question 28.

Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

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- Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question that you are continuing to answer at the top of the page.

Suggested working time: 30 minutes.

Question 27 **(25 marks)**

Coastal ecosystems are in a world-wide decline as a result of human impacts on the marine environment. Estimates suggest that 30 to 60% of the world's mangroves have already been lost and seagrass meadows are declining at similar rates.

a. Why is seagrass classified as an Angiosperm (flowering plant) and not part of the Algae division?

2 marks

b. Describe three ways in which mangrove trees have adapted to the marine environment.

3 marks

c. Many demersal fish use seagrass meadows during the juvenile stage of their life cycle.

Name a demersal fish (not previously stated in this exam paper) and describe four advantages that a seagrass meadow can provide for juvenile fish.

5 marks

d. Explain how the interaction of seagrass meadows and mangroves is mutually beneficial in supporting the marine environment.

5 marks

e. Explain the impact that a loss of seagrass meadow and mangrove habitat would have on a coral reef ecosystem.

6 marks

f. Explain how human activities are threatening mangrove, seagrass meadow and coral reef ecosystems in terms of:

i. Nutrients
ii. Habitat destruction

4 marks

Question 28 **(25 marks)**

a. The Leeuwin current is the world's longest continuous coastal current. Explain how the Leeuwin current forms, identifying its origin and direction of flow.

6 marks

b. The marine ecosystems along the West Australian coastline contain a unique mix of tropical and temperate species, many of which are endemic to the area. Explain why this unusual assemblage of species is found in WA coastal marine communities.

4 marks

c. What effect would a strong El Nino event have on the Leeuwin current? Explain your answer.

5 marks

d. What influence would a strong El Nino event have on West Australian Rock lobster recruitment along the inshore coastal reef systems?

4 marks

e. Give two **organism-based** management strategies that would ensure the sustainability of the WA rock lobster population for future generations. For each strategy, explain how it would protect the stock of the fishery.

6 marks

End of questions

See next page

Question number: _____

Question number: _____

See next page

Question number: _____

Question number: _____

See next page

Question number: _____

Spare working space

See next page

Spare working space